Water Conservation Plan

[Entity], a Member of the Pulp and Paper Sector

Michigan Chamber of Commerce

February 2008

Submitted by Barr Engineering Company

Water Conservation Plan

Table of Contents

1.0 Introduction

Public Act 35 of 2006 (PA 35 of 06) requires that each water use sector develop voluntary guidelines for generally accepted water management practices or environmentally sound and economically feasible water conservation measures. The Act allows for such guidelines to be developed and adopted by an established statewide professional or trade association representing that sector.

In response to PA 35 of 06, the Michigan Chamber of Commerce (Chamber) has developed this template for a Water Conservation Plan (Plan) to serve as a guide for the Pulp and Paper sector.

The Chamber, and its constituents, recognize that the development of the voluntary guidelines as set forth in PA 35 of 06, also meet the requirements of the Great Lakes Charter Annex Compact for existing water users, and is consistent with the recommendations of the Groundwater Advisory Council. Specifically, Article 203 of the Proposed Compact - The Decision-Making Standard for Management of Withdrawals and Consumptive Uses within the Great Lakes - St. Lawrence River Basin Sustainable Water Resources Agreement, states:

> *"The withdrawal or consumptive use shall be implemented so as to incorporate environmentally sound and economically feasible water conservation measures."*

The Groundwater Conservation Advisory Council's February 6, 2006 Final Report to the Legislature provided several recommendations. Within them, Recommendation # 10 states:

> *"Each water-use sector should develop its own sector-specific water management practice. These should be reviewed and evaluated by a closely related professional or trade association. Water users within each sector should be encouraged to adopt and implement the water management practices specific to their sector."*

The guidelines developed in this Plan exemplify environmentally sound and economically feasible water conservation measures through best management practices (BMPs).

2.0 Plan Objectives

2.1 Objectives

The Pulp and Paper sector has developed a broad set of "objectives" identifying the sector's strategy for implementing voluntary water conservation practices and improving water efficiency as part of this Plan. The objectives for this Plan include the following:

- Establish an understanding of current water use (e.g. system-wide water use audit) to establish an understanding of how water is utilized at the facility.
- Improve, modify, or audit processes to increase efficient water use (e.g. optimize efficiency of cooling systems) to encourage improvement of processes that inefficiently use water.
- Develop, implement, and document Best Management Practices (BMPS) for water conservation at the facility to reduce water use from the levels that would exist without conservation efforts. Implementation of these BMPs needs to be based on both technical and economic feasibility.
- Incorporate water conservation practices and awareness into employee training programs.
- Review and modify Plan on a periodic basis.
- Provide documentation related to implementation of the Plan (e.g. self-certification with oversight provided through the Chamber).
- These objectives are currently being met by participants in the Michigan Pulp and Paper Pollution Prevention Program (P5), a government-industry partnership focused on voluntary reductions in emissions and water use in Michigan's pulp and paper industry.

3.0 Characterization of Current Water Usage

An important component of a water conservation Plan is the characterization of a facility's current water usage. This includes characterizing how water flows through a facility or system, identifying what purpose the water plays within the system, identifying specific equipment that uses large quantities of water, and finally, identifying how water is discharged from the system.

3.1 Current Water Usage

The following elements provide a guideline for performing a water usage characterization as part of a water conservation Plan:

[Entity provides information including, but not limited to:]

- Describe the source of water and how it flows to and through the facility systems.
- Identify significant water use processes, operations and equipment and account for significant sources and losses.
- Describe water metering and water use tracking, if any.
- Describe leak detection and repair program, if any.
- Identify current reclamation and reuse of water throughout the process, including how much water is used and not available for reuse.
- Identify how water is discharged from the process.

3.1.1 Description of Water Use

[Entity adds description here]

3.1.2 Significant Water Use Processes

[Entity adds description here]

3.1.3 Water Metering and Tracking

[Entity adds description here]

3.1.4 Leak Detection and Repair Programs

[Entity adds description here]

3.1.5 Reclamation and Reuse

[Entity adds description here]

3.1.6 Means of Discharging Water

[Entity adds description here]

4.0 Implementation of BMPs for Water Conservation

Implementation of BMPs for increasing water conservation and improving water efficiency are an important component of this water conservation Plan. This section outlines what BMPs *[entity]*, in the Pulp and Paper sector, is currently utilizing to meet the Plan's overall conservation goals.

(Check those that apply)

- ☐ Install water meters in high use areas to encourage conservation and accountability
- ☐ Install cooling towers to reduce once-through cooling water use, where appropriate
- ☐ Retrofit applications that use once-through cooling water (chillers, compressors, condensers, etc.) with closed-loop recirculation systems
- ☐ Replace water-cooled equipment with air cooled equipment
- ☐ Replace liquid ring vacuum pumps with mechanical seal vacuum pumps
- ☐ Use clean in place technologies
- ☐ Operate pumps at minimum process rates to reduce excessive pumping
- ☐ Calibrate and clean process equipment to optimize thermal and hydraulic performance efficiency
- ☐ Consider the installation of surge tanks to prevent overflow or the installation of float-controlled valves on makeup water lines
- ☐ Turn off equipment that is not in use and during shutdowns
- ☐ Install flow restrictors, aerators, spring-loaded valves and timers on faucets and nozzles
- ☐ Use fogging nozzles or mist eliminators to minimize water losses in cooling towers
- ☐ Investigate alternative water sources for major processes, including using clarified, cooling or waste water for certain processes
- ☐ Investigate process and equipment upgrades that result in more efficient operations and water use, (e.g. adjusting water intake design and pump speed, optimization of the whitewater system in the mill)
- ☐ Consider opportunities for water reclamation and reuse throughout the process and facility
- ☐ Install high-pressure, low-volume shower heads and low-flow or waterless toilets
- ☐ Consider chemical treatments to reduce the amount of make-up water required for cooling towers, steam boilers, etc.
- ☐ Consider landscape alterations that demand less watering and prevent less runoff
- ☐ Monitor drought and water stress conditions regionally and communicate awareness issues throughout the organization
- ☐ Install drip irrigation to reduce watering use
- ☐ Include water conservation policies and procedures into employee training programs
- ☐ Participate in water conservation advisory group or organization to raise awareness

☐ Incorporate water conservation practices into employee training programs

☐ Implement a leak detection and repair program to mitigate water losses

☐ Other water conservation best management practices as listed in Appendix A (describe which practices are being implemented from Appendix A, below):

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

☐ Other

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

5.0 Evaluation and Modification of the Plan

Upon implementation of this Water Conservation Plan, the *[Entity]* will evaluate and update the Plan on a periodic basis. Modifications to the Plan will be based on an evaluation of the water conservation GAMPs previously implemented and upon any new relevant information. This section is intended to satisfy the requirements under the Great Lake Compact for new or increased water withdrawals by demonstrating progress towards achieving improvements in water conservation. Any water conservations measures for existing water uses is considered entirely voluntary.

The [Entity] will consider documenting the following information to evaluate the existing Plan:

- A list of dates and descriptions of conservation measures implemented

  [Entity adds description here]

- Approximate amounts of water saved for each measure implemented

  [Entity adds description here]

- Discussion about whether or not the goals of the plan have been met

  [Entity adds description here]

- If objectives were not met, an explanation as to the reason why the objectives were not met and a discussion of the specific revisions to the Plan intended to help meet the objectives in the future.

  [Entity adds description here]

Appendix A - Water Conservation Best Management Practices for Pulp and Paper Mills

Paper mills use water as a medium to transport fibers, energy and chemicals during the production of paper. The volume of water used per ton of paper produced depends on several factors including the types of products, the equipment used, the configuration or arrangements of the equipment, the production process, the operating conditions and parameters. Pulp and paper mills use water in a variety of processes; however, Michigan mills are typically not consumers of water – that is to say that the water which is withdrawn for processes is returned to receiving waters or the atmosphere (evaporative). Depending on the water leaving with the product and the incoming water from raw materials, water may or may not be consumed in the process.

The Michigan Pulp and Paper Pollution Prevention Program (P5), a partnership between government and industry, has had great success over the past decade through voluntary objectives for reducing emissions to the environment as well as for decreasing utilization of water resources. Between 1996 and 2003, P5 members have realized a nearly 2.3 billion gallon reduction in water use[1] in their pulp and paper facilities. This commitment to reducing water use speaks volumes about the worth of such voluntary programs and demonstrates the successes that can be achieved through implementing best management practices, some of which are listed below.

The following voluntary best management practices for water conservation are intended as a guide to address common processes in most pulp and paper mills. While this is not an exhaustive or exclusive list, this document forms a foundation for basic water conservation strategies at many pulp and paper mills. Specific strategies may vary, based on mill age, type, and the mix of products being manufactured at a given location. When selecting best management practices, consideration should be given to their economic and technological feasibility, in order to provide the greatest conservation benefit for the implementation cost. An important component of technological feasibility is the relationship between concentration of effluents due to lower water use and the potential impacts that may have on receiving waters, process equipment due to increased corrosivity, and the finished product.

Generic Recommendations
A significant reduction in fresh water usage can be realized by optimizing the design and operation of the whitewater system in the mill. Whitewater should be the primary source of water for pulping especially when its color is compatible with the color of the paper being produced. The use of fresh water for Headbox, Breast, Knockoff, Forming Fabric, and Wire Return Roll Showers for most paper machines can be substituted with screened and clarified whitewater. Process piping should be inspected for leaks and repaired as soon as possible upon detection. All plant personnel should be educated about these water conservation strategies through a facility-wide program in order to facilitate achieving the water conservation goals specified below.

Pulper
Whitewater should be used for making stock. Whitewater from the machine room or the whitewater chest should be the first source of water for stock preparation, if the color is acceptable for the grade of paper to be produced.

[1] http://www.michiganforest.com/documents/P5_Annual_Report_2003_Final.pdf

Vacuum Seal Water
The temperature of effluent seal water is higher than that of the feed water. Besides the increase in temperature, the main contaminants in seal water are fiber and felt hair. There could also be some solids pick up from the felt. A cooling tower can be installed to reduce the temperature and screens and filters can be used to remove the other contaminants. However, this system cannot be run as a closed loop due to conductivity build. The high conductivity can greatly decrease the life of the pumps due to attacks on metallurgy. It must be continuously purged. Another option is to route the seal water to a whitewater chest or back to the bleach plant for stock dilution. The cleaned water can then be reused. It is also possible to cascade the cooler seal water effluent from the high vacuum pumps (couch, flat boxes) to the low vacuum pumps (press, felt conditioning, etc.). The hot water now generated can be stored and used for stock preparation.

Non-Contact Cooling Water
Non-contact cooling water should be collected and stored in the hot water storage tank. Water from this tank can be used for stock preparation in the pulper, preparation of additives, colors and finishing materials. The viability of doing this depends on the heat balance in the mill's water system.

Felt Cleaning Water
Fresh water is often utilized for felt cleaning on paper machines and presses and discarded to the sewer thereafter. The used water would typically contain felt (hair) and low concentrations of fiber, color and stock additives. It is possible to separate the felt/hair component and reuse the water upstream in stock preparation.

Showers
Check to see if high-pressure, low-volume showers instead of low-pressure, high-volume showers can be used for every application. Clarified white water can be used for guide edge knock-off showers, guide showers and breast roll showers. Some guide roll showers can be connected in a sequence that allows fresh water supply to only one while the others are fed with filtered effluent from the preceding shower.